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Sfeir

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[54] **VIBRATIONAL WALKING APPARATUS**

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[51] **Int. Cl.**[6] **A45B 3/00**

[52] **U.S. Cl.** **135/66**; 135/911

[58] **Field of Search** 135/65, 66, 68, 135/72, 76, 911

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,791,762	5/1957	Berry	340/258
3,029,828	4/1962	Kravitt	135/85 X
3,158,162	11/1964	Reel	135/85 X
3,158,851	11/1964	Ruthven	340/258
3,251,371	5/1966	Croker	135/47
3,546,467	12/1970	Benjamin, Jr. et al.	250/215
3,996,950	12/1976	Mier	135/66
4,280,204	7/1981	Elchinger	367/116
4,559,962	12/1985	Marchiano	135/85
4,648,710	3/1987	Ban et al.	356/4
5,097,856	3/1992	Chi-Sheng	135/72
5,219,402	6/1993	Kondo et al.	135/911 X

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Attorney, Agent, or Firm—Mathews, Collins, Shepherd & Gould, P.A.

[57] **ABSTRACT**

The invention relates to a vibrational walking apparatus including a frame having flexible projections capable of detecting obstructions to the front or sides of the user. Width projections can extend laterally from the frame to detect a predetermined width of the user. The apparatus can include a height sensor to determine if an object will contact the upper extremities of the user. A vibrator located adjacent a handle is activated by switches coupled to the flexible projections and height sensor in order to provide a different vibrational frequency to the handle when one of the respective flexible projections or height sensor is activated.

7 Claims, 2 Drawing Sheets

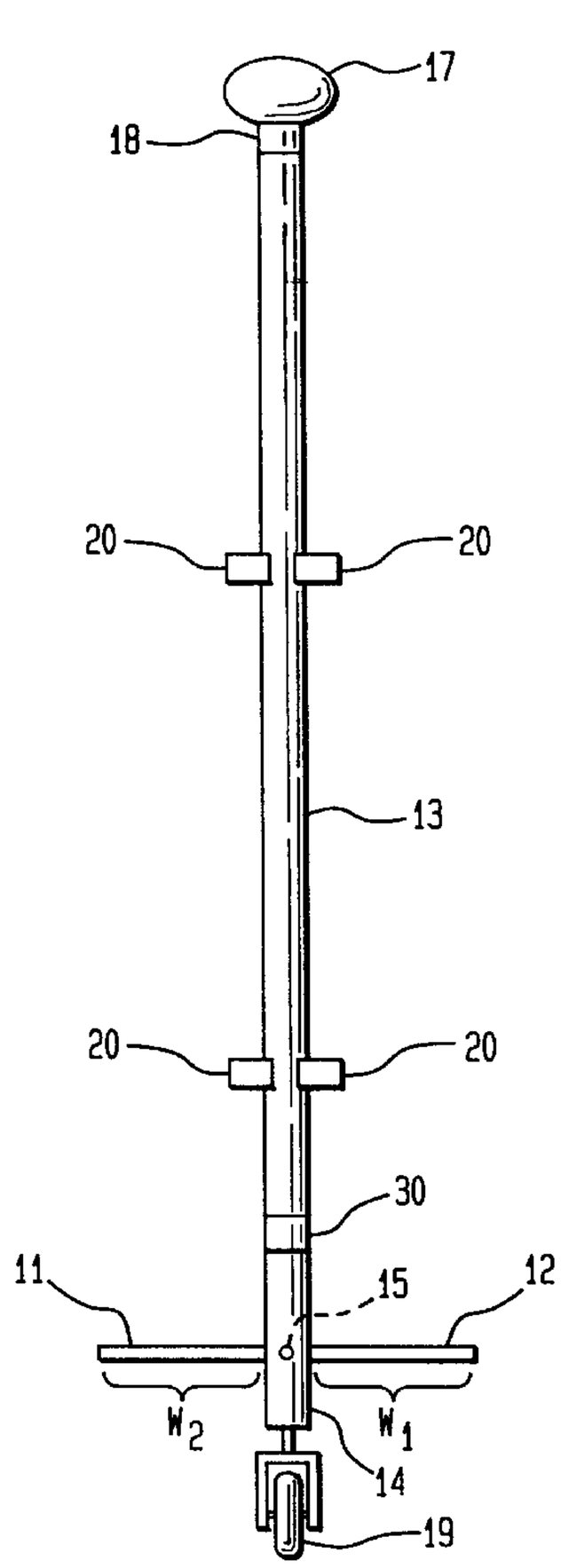
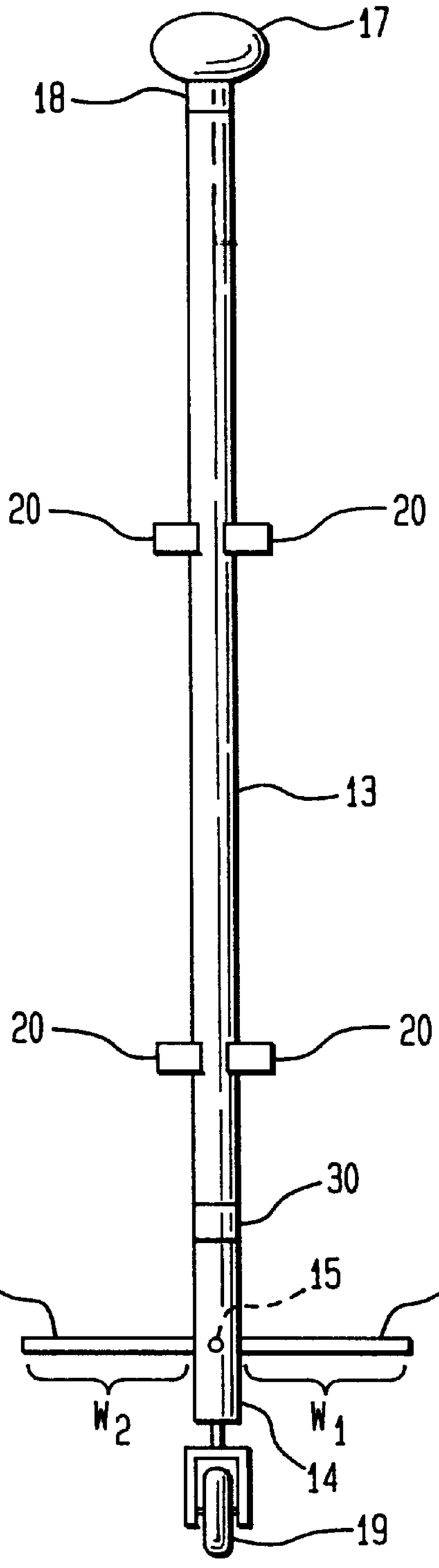


FIG. 1


10
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W2
W1
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FIG. 2

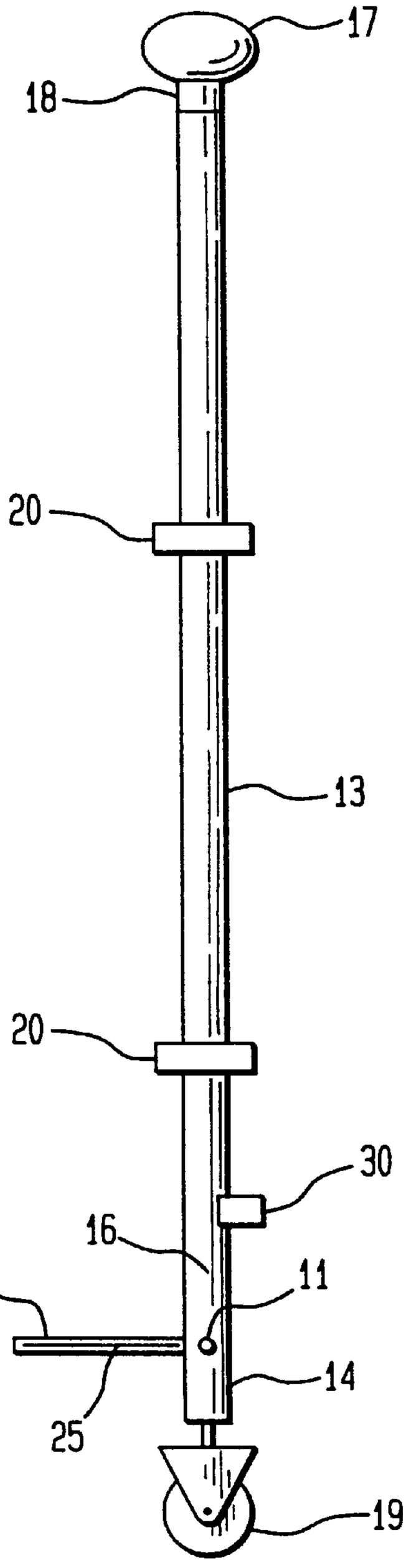
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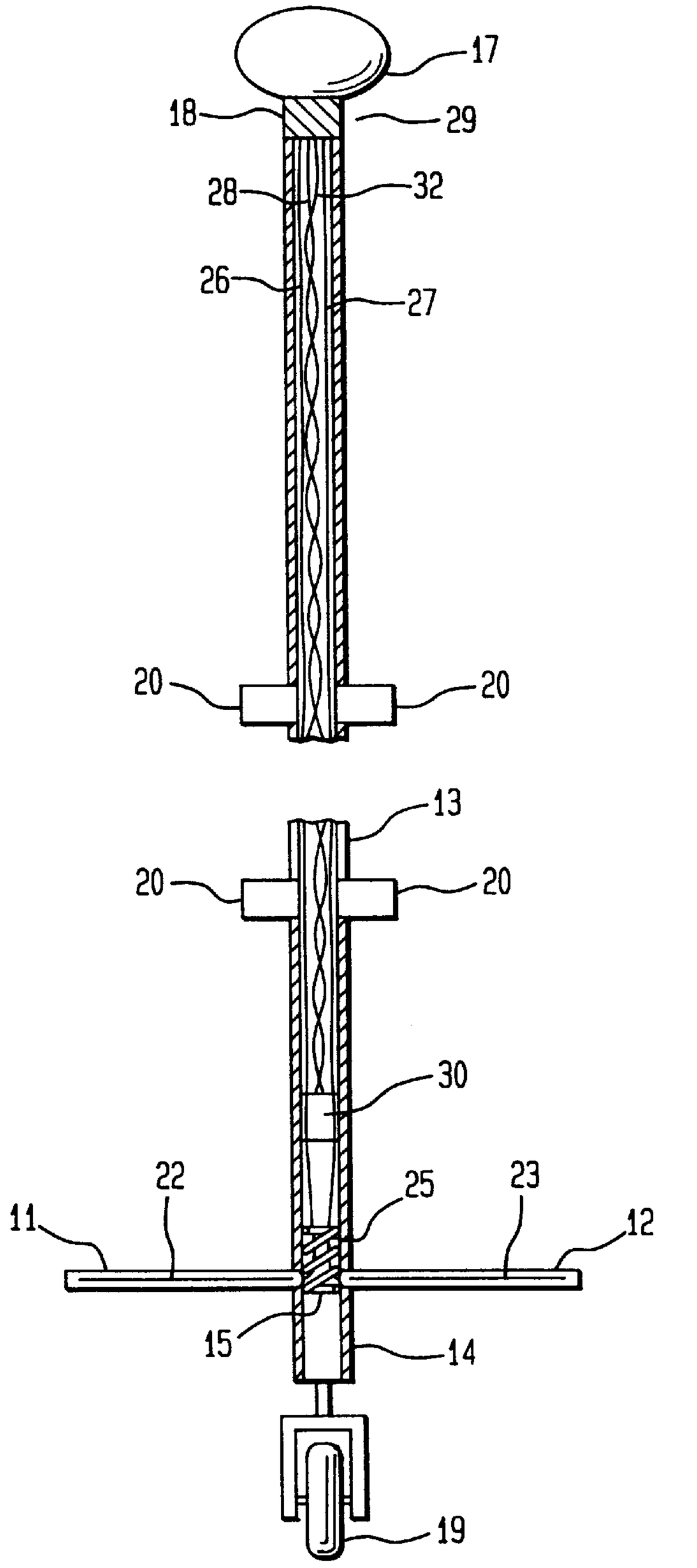
FIG. 3



VIBRATIONAL WALKING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a vibrational walking apparatus for the visually impaired or visually and hearing impaired in which different vibrational frequencies are used to indicate an obstruction in the front at either side of the user or low-lying obstructions which might contact the user

2. Description of the Prior Art

Conventionally, visually impaired persons have detected objects within their path by tapping the path at a short distance directly in front of the user's feet and occasionally to the right or left of the center of the course. Improvements have included canes with additional indication apparatus or sensing apparatus.

U.S. Pat. No. 3,251,371, describes a wheel mounting cane with laterally extending flexible arms positioned at the lower end of the cane to sense obstacles along and adjacent the cane path. Miniature bells located at the end of the arms on the cane are arranged to sound when the flexible arms contact any object on either side of the cane.

U.S. Pat. No. 3,158,162, describes a cane with feelers or detectors which transmit shock or vibration, attenuated by intervening springs disposed in the cane shaft. Whenever the detectors strike an obstruction during use of the cane, the shock of the impact induces mechanical vibration which travels through the cane to the handle. The above described patents have the shortcoming of not providing an indication as to which side of the cane was contacted by the object.

U.S. Pat. No. 3,158,851, describes a cane equipped with side projections of resilient construction. A handle includes a left and right handle portion to support respective right-side and left-side vibrators. The vibrators are connected with microswitches to respective right-side and left-side projections. The vibrators are electric buzzers which provide both audible and tactile signals. When an object is contacted, either the right or left side vibrator is activated to emit a buzzing sound. After hearing the buzzing sound, the user can spread his cane grasping hand to a both the right-side and left-side vibrators to determine which vibrator was activated. This patent has the drawback of being applicable only to persons who are not hearing impaired and of being cumbersome to operate.

U.S. Pat. No. 4,280,204, relates to a cane for the blind having an ultrasonic obstacle sensing apparatus for warning of low lying objects that might contact the upper extremities of a user or for warning of more remote objects. A transducer mounted on the shank portion of the cane transmits and receives a directional ultrasonic energy signal. In detecting remote objects, the cane is rotated about the longitudinal axis towards the object. An audible signal is routed to a set of earphones connected from the cane to the user. For detecting remote objects during movement of the user, the cane is rotated by the user towards the object while walking which maybe confusing to a visually impaired person. This patent is also limited to persons who are not hearing impaired.

SUMMARY OF THE INVENTION

Briefly described, the present invention relates to a vibrational walking apparatus in which different vibrations are generated in a handle for indicating that an obstruction is in front, to the right or left of the user or that an obstruction is in the path of the upper extremities of the user. An elongated

frame includes a pair of flexible width projections extending laterally from the side to the frame. A front flexible projection extends laterally from the front of the frame. A switch is coupled from each of the projections to a vibrator located adjacent the handle. Contact of one of the flexible projections with an object generates a predetermined vibrational frequency in the vibrator for vibrating the handle at differing frequencies.

In one embodiment, the projections are formed of a spring extending from the frame attached to a respective switch. Alternatively, the projection can be a sensor. Preferably, the projections can be removable from the frame.

A height sensor can be coupled to the frame for generating a predetermined vibrational frequency when an object is lower than the upper extremities of the user. The vibrational frequency generated by the height sensor is different than the vibrational frequency generated by the width and front projections.

The frame can be telescopically adjustable to the height of the user or for ease of storing or carrying the apparatus when not in use. Reflectors can be coupled along the length of the frame for night safety.

In use, the flexible width projections generate different vibrational frequencies to the handle when the user approaches areas smaller than the user's shoulders. The front projection generates a different vibrational frequency to the handle when the user contacts an object in front of the user. A height sensor generates a different vibrational frequency to the handle when the user approaches an area shorter than the user's head.

The advantages and various additional features of the invention will appear more fully upon consideration of the illustrative embodiments now to be described in detail in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front elevational view of a vibrational walking apparatus in accordance with the teachings of the present invention.

FIG. **2** is a side elevational view of a vibrational walking apparatus shown in FIG. **1**.

FIG. **3** is a cross-sectional view of the vibrational walking apparatus shown in FIG. **1**.

DETAILED DESCRIPTION OF THE INVENTION

During the course of this description like numbers will be used to identify like elements according to the different figures which illustrate the invention.

FIG. **1** is a front elevational view of a vibrational walking apparatus **10** in accordance with the teachings of the present invention. A pair of flexible width projections, **11, 12** extend laterally from frame **13**. Flexible width projections **11, 12** detect obstructions on either side of a user of vibrational walking apparatus **10**. Flexible width projections **11, 12** can be positioned at the bottom **14** of frame **13**. Preferably, flexible width projection **11**, has a width w, and flexible width projection **12** has a width W_2 such that the combined width of w_1 and w_2 is about the width of the shoulders of a user when flexible width projections **11, 12** are attached to frame **13**. Flexible front projection **15** can be positioned between flexible width projections **11, 12** at the front **16** of frame **13** as shown in FIG. **2**.

Frame **13** can be adjusted for the height of the user. Frame **13** can be telescopically adjustable for increasing or decreas-

ing the length of frame **13** for adjustment to the height of the user. The length of frame **13** can also be decreased to allow frame **13** to be easily carried and stored when not in use.

Vibrating handle **17** is positioned at top **18** of frame **13**. Wheel **19** positioned at bottom **14** of frame **13** can be used to support frame **13**. Reflectors **20** are coupled along the length of frame **13** for providing night safety.

Flexible width projections **11**, **12** can be formed of respective springs **22** and **23**, as shown in FIG. **3**. Springs **22** and **23** are coupled with respective switches **26** and **27** to vibrator **29**. Flexible front projection **15** is formed of spring **25**. Spring **25** is coupled with switch **28** to vibrator **29**. For example, a microswitch and spring assembly can be used as described in U.S. Pat. No. 3,158,851 hereby incorporated by reference into this application. Switches **26**, **27** and **28** can be coupled to vibrator **29** with an electrical connection which in turn is coupled to an energy source (not shown). Vibrator **29** is positioned adjacent vibrating handle **17**. Vibrator **29** generates varying vibrational frequencies, depending on which of switches **26**, **27** or **28** is activated. For example, during use if flexible width projection **11** contacts an object, switch **26** activates vibrator **29** at a particular vibrational frequency such as a low vibrational frequency. Alternatively, if flexible width projection **12** contacts an object switch **27** activates vibrator **29** at a different vibrational frequency, such as a high vibrational frequency. If flexible front projection **15** detects an object switch **28** activates vibrator **29** at a different vibrational is frequency between the high vibrational frequency and the low vibrational frequency.

Alternatively, flexible width projections **11**, **12** and flexible front projection **15** can be formed of a sensor for detecting objects at a predetermined distance from frame **13**. The predetermined distance from the frame can be the width of the user. In this embodiment, flexible width projections **11**, **12** can have a width which is narrower than the width of the user. For example, the sensor can include a light emitting element which converges on an object to be detected and a receiving element for receiving the light reflected by the object to activate respective switches **26**, **27** or **28**. It will be appreciated that other sensors can be used with the present invention, for example, as described in U.S. Pat. Nos. 3,546,467; 5,097,856; and 4,280,204, hereby incorporated by reference into this application.

Height sensor **30** can be attached to frame **13** between flexible width properties **11**, **12**. Height sensor **30** is focused upwardly of frame **13**. Height sensor **30** can be adjusted to detect low lying objects which may contact the upper extremities of the user. Height sensor **30** can be coupled with switch **32** to vibrator **29**. Switch **32** activates vibrator **29** at a different vibrational frequency than switches **26**, **27** and **29**.

It is to be understood that the above-described embodiments are illustrative of only a few of the many possible specific embodiments which can represent applications of the principles of the invention. Numerous and varied other arrangements can be readily devised in accordance with these principles by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. A vibrational walking apparatus for use by visually impaired or visually and hearing impaired persons comprising:

an elongated frame;

a first and second flexible width projection coupled to said frame and; extending laterally from a first and second side of said frame;

a front flexible projection coupled to said frame extending laterally from the front of said frame;

a vibrational handle positioned at the top of said frame; and

a vibrator coupled to said first and second width flexible projection, said front flexible projection and said vibrational handle, said vibrator providing a plurality of vibrational frequencies for vibrating said vibrational handle at differing frequencies,

wherein a first one of said vibrational frequencies is generated when said first flexible width projection contacts an object, a second one of said vibrational frequencies is generated when said second flexible width projection contacts an object and a third of one said vibrational frequencies is generated when said front flexible projection contacts an object.

2. The apparatus of claim **1** further comprising:

a height sensor coupled to said frame,

wherein a fourth one of said vibrational frequencies is generated when said height sensor senses an object.

3. The apparatus of claim **1** wherein said first and second flexible width projections and said front flexible projection are removable.

4. The apparatus of claim **1** wherein said frame is telescopically adjustable.

5. The apparatus of claim **1** wherein said first and second flexible width projection and said front projection are each formed of a spring coupled to a switch, said spring extending from said frame, said switch being coupled to said vibrator.

6. The apparatus of claim **1** wherein said first and second flexible width projection and said front flexible projection are formed of a sensor.

7. An apparatus of claim **1** further comprising reflectors coupled along the length of said frame.

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